SETTING TRENDS
FOR DECADES

KUDELSKI GROUP 2019

NAGRA
KUDELSKI GROUP

CONTENTS

ENJOYING LEISURE TIME

You want to enjoy recreational activities
relaxed and with as little constraint as possible.

Watching an iconic movie at home
or while travelling, hitting the slopes in total
freedom, without queuing, passing the stadium
gates smoothly to watch a game of football,
leaving your car at the airport before
your trip, whatever the occupation,
the Kudelski Group's technologies are
here to make simplicity happen.

Discreet though efficient, they ensure
comfort and peace of mind, providing
smooth and secure access to a wide variety
of entertaining moments.

TO THE HIGHEST HEIGHTS…
AND BEYOND

First Everest expeditions, Mariana Trench exploration, Apollo missions… NAGRA recorders have been the adventurers' companions for decades.

Used by Hollywood sound engineers, intelligence agencies, reporters, music lovers and more, they testify to the pioneering spirit that the Kudelski Group has demonstrated throughout its 67-year history.

From the revolutionary NAGRA recorders to the first hands-free ski access cards and the more recent intuitive and immersive ultra HD content discovery platforms, the Group's innovations accompany people in some of their boldest and most entertaining experiences.

"Our goal has always been to manage the Group with a long-term perspective, pioneering new technologies and delivering solutions of excellent quality that are impressive technically, from an end-user standpoint and for our customers."

INTERVIEW WITH ANDRÉ KUDELSKI

Chairman and Chief Executive Officer
of the Kudelski Group

How would you characterize 2018 for the Kudelski Group?

As expected, 2018 was a challenging year, underscoring the importance of the transformation efforts previously initiated by the Group in 2017. The Group realized the first tangible results from these efforts last year.

The Group continued to shift its investment efforts from its traditional Digital TV activities to new growth initiatives, including Internet TV, Cybersecurity and Internet of Things (IoT), as well as to its Public Access business.

For Digital TV, important milestones were achieved during the year, including the integration of CONAX with NAGRA, implementation of a cost reduction program and the simplification of the product portfolio, most notably through the divestment of SmarDTV. The combination of these measures has allowed the Digital TV segment to improve its structural profitability in spite of the forecasted revenue decline, while at the same time maintaining strong investment in the Group's innovation efforts.

In order to allow shareholders to better understand our market dynamics, the Board of Directors has decided to improve the transparency of the Group's financial reporting. For the year ended December 31, 2018, we are now reporting four separate segments: Digital TV, Cybersecurity, IoT and Public Access.

Kudelski Security (Cybersecurity) has continued to shift its revenue mix from technology resale to higher value-added activities, such as executive level advisory services, managed security services and sales of proprietary solutions. As a result, Kudelski Security's gross margin and operational profitability improved in 2018, even if revenues declined for the year other than in Switzerland, where revenues increased by 57% compared to 2017.

Still in an early development phase, the Group's IoT business continued to invest in further developing its comprehensive secure IoT platform and also added a growing number of partners in order to market this platform effectively in new industry verticals.

In Public Access, SKIDATA continued its impressive track record of development, evolving from an electro-mechanical equipment provider focusing on the European market when the Group acquired the company in 2001 to now being the worldwide leader in revenue and access management for parking, ski and events infrastructure operators. After more than a decade of 10% CAGR, SKIDATA's growth rate in 2018 was disappointing at 3%, and its operating profit for the year decreased as compared to 2017 due to lower than expected revenues in November and December.

With that in mind, how do you foresee 2019?

Our goal has always been to manage the Group with a long-term perspective, pioneering new technologies and delivering solutions of excellent quality that are impressive technically, from an end-user standpoint. We have always been keenly focused on areas in which we are critical to the business of our customers.

While we will continue to transform the Group to better position it for the future, we do not expect a material improvement in our financial outlook for 2019. As part of the transformation, we will continue to improve our Digital TV segment's performance by focusing our innovation efforts on new promising initiatives and by further optimizing our structural profitability.

For Kudelski Security, we will further develop our high value-added activities, including managed security services, our innovative product portfolio and our Blockchain Center of Excellence.

Kudelski IoT will continue to develop its multi-industry secure IoT platform and will expand its collaboration with existing and future partners to address effectively high potential IoT market segments.

The Group has recently launched an initiative to improve the efficiency of SKIDATA and to restore both profitability and growth, setting a strong foundation for positive developments for Public Access in the future.

In 2017, the Group initiated an important transformation effort that spanned across all its businesses. What is the status today?

Our transformation efforts have been focused on four key goals: (1) reduce our cost to serve, (2) get closer to our key customers, (3) maintain our pace of innovation and (4) improve our delivery excellence.

Our significant efforts have already helped the Group to better focus on new promising initiatives, while improving the structural profitability of its existing core business. The real challenge with transformation is to be able to maintain momentum in innovation while simultaneously downsizing declining activities.

This task is very challenging, but with the help and the support of our teams around the world, we have been able to make it happen while continuing to serve our clients with the highest standards of service and quality. I would like to take this opportunity to thank our employees for their high level of commitment and professionalism in the face of an increasingly challenging market environment.

Will your transformation efforts continue in 2019?

Our transformation is not over, but our focus has evolved. In 2017 and 2018, our priorities largely involved reducing our cost base. For 2019, we will increasingly focus on positioning our offering to serve new market opportunities more effectively.

We will also focus on better leveraging the synergies between entities of the Group. Technology developments, location mix, talent and capabilities management are aspects that share common needs and attributes across our Group companies. We intend to go further in reinforcing the entrepreneurial spirit within the Kudelski Group.

What are the main trends in Digital TV? And how does the Group plan to address them?

Classical pay-TV remains under pressure from new OTT players, including the digital Internet giants. However, most pay-TV network operators have been able to find solutions to stay competitive in this market. We must not forget that this market includes the largest catalogue of premium content in the world and the largest subscriber footprint.

In such an environment, we see a growing number of collaborations between traditional pay-TV operators and new Internet platforms, offering the Kudelski Group opportunities to link the two worlds. The experience of the Group and its reputation of sustainability in the premium content creation and distribution industry for more than 65 years are core assets.

In such a competitive landscape, we see continued investments being made by pay-TV network operators to better compete and adopt new technologies developed by the Group, such as our end-to-end security solution or our Insight business performance platform.

The pure OTT market is also an opportunity for the Kudelski Group, since several of our new solutions have been specially optimized to serve this market, including our end-to-end security solution, watermarking solutions, advanced user experience platform and Insight.

What are the priorities for Public Access?

Over the last decade, SKIDATA has proven its capability to deliver continued revenue growth with sustainable profitability. From that perspective, 2018 was an exception, which has triggered the need to transform SKIDATA to better address future opportunities. The main priority for 2019 and beyond is to restore SKIDATA's profitability, cash flow generation and growth in a sustainable way.

Innovation is also key for building the future of SKIDATA. We will continue to release high-value solutions that will allow our customers to increase their revenues in a significant way.

How is the Cybersecurity business developing, especially with regards to new product launches?

We see, from an industry standpoint, that major breaches still happened in 2018 and that large enterprises and governments are not well-equipped to detect, diagnose and respond.

When the Group decided to enter the US cybersecurity market with the acquisition of two companies that were active primarily in the business of technology consulting and resale, the goal was to get access to the largest security market in the world. This strategy allowed us to quickly gain a significant distribution channel to sell our high value-added proprietary solutions and services. Our focus for Kudelski Security is to develop new proprietary solutions that will deliver significant margins for

the future. New products launched in 2018 include the Secure Blueprint and Managed Secure Enclaves, in addition to the advanced cyber fusion centers in Cheseaux (Switzerland) and Phoenix (USA), which gained significant traction in the market.

In IoT, could you elaborate on the strategy and the success to date?

IoT security is a natural move for the Kudelski Group, since IoT security can fully benefit from the experience of the Group in Digital TV and cybersecurity. We combine the embedded IoT client's security and real time secure backend management with our cybersecurity expertise for a smooth integration of IoT devices within a securely managed IT environment.

In 2018, the priority for Kudelski IoT was to develop its secure proprietary IoT platform and to build partnerships with leaders in high potential IoT industry verticals. In 2019, we will continue in the same direction and add new strategic partners in industries where security is critical.

Our key differentiation in this sector is to provide a secure IoT management platform, combined with the diagnosis, certification and response capabilities made possible by our advanced labs, with the ability to manage the entire security life cycle of a given device.

What will be the distribution to shareholders for fiscal year 2018?

After having carefully reviewed the 2018 performance and the future outlook, the Board of Directors has decided to propose a distribution, as a return of capital, of CHF 0.10 per bearer share (CHF 0.01 per registered share).

What is the outlook for 2019?

For 2019, the Group expects a stable to slightly higher revenue base and an EBITDA ex restructuring costs in the range of USD 80 to 95 million.

The traditional pay-TV business is expected to stabilize in 2019. Cybersecurity is expected to continue adding new clients, expanding geographical coverage and, as a result, increasing profitability by leveraging strategic offerings and high value-added services. The Group will also continue to invest in the IoT domain. For Public Access, our focus will be on improving cash flows and restoring a higher level of profitability.

On behalf of the Board of Directors, I would like to take the opportunity to thank our shareholders, employees, clients and partners for contributing to the long-term success of the Group and for supporting us especially during these challenging times.
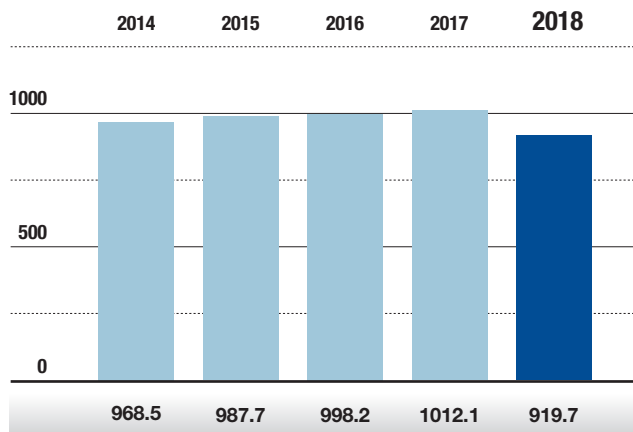

"For 2019, we will increasingly focus on positioning our offering to serve new market opportunities more effectively. We will also focus on better leveraging the synergies between entities of the Group."
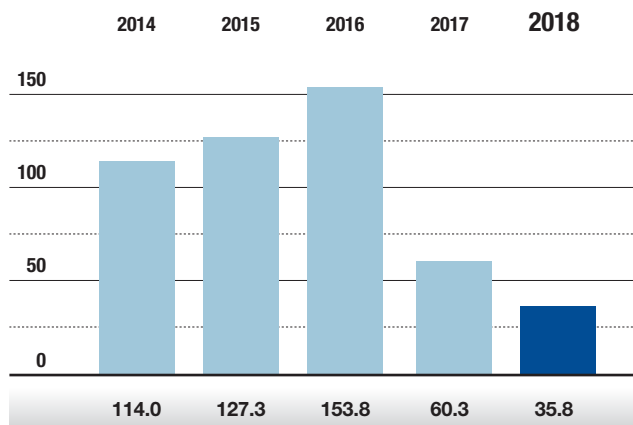
KEY FINANCIAL DATA 2018

		31.12.2018	31.12.2017	Change
Total revenues and other operating income	USD million	**919.7**	**1012.1**	**-9.1%**
Operating income before depreciation, amortization and impairment (OIBDA)	USD million	**35.8**	**60.3**	-40.7%
in % of total revenues	%	4%	6%	
Operating income (EBIT)	USD million	**-7.3**	**21.8**	-133.5%
in % of total revenues	%	-1%	2%	
Net income from continuing operations	USD million	**-24.3**	**-1.4**	1665.9%
Earnings per share	USD	**-0.5218**	**-0.2716**	
Money returned to shareholders (proposed per bearer share)	CHF	**0.1**	**0.1**	
Share price at December 31 (bearer shares)	CHF	**5.64**	**12.05**	
Market capitalization at December 31 (bearer shares)	CHF million	**281.5**	**599.6**	
Equity attributable to equity holders	USD million	**406.6**	**469.2**	
Cash flow from operating activities	USD million	**-4.7**	**-54.2**	
Cash and cash equivalents	USD million	**86**	**71.9**	
Financial debt	USD million	**-462.3**	**-424.4**	
Number of employees at December 31 (headcount)		**3742**	**3940**	

Total revenues and other operating income

In million USD

	2014	2015	2016	2017	**2018**
	968.5	987.7	998.2	1012.1	919.7

OIBDA *

	2014	2015	2016	2017	**2018**
	114.0	127.3	153.8	60.3	35.8

Net income from continuing operations

	2014	2015	2016	2017	**2018**
	55.5	51.2	88.5	-1.4	-24.3
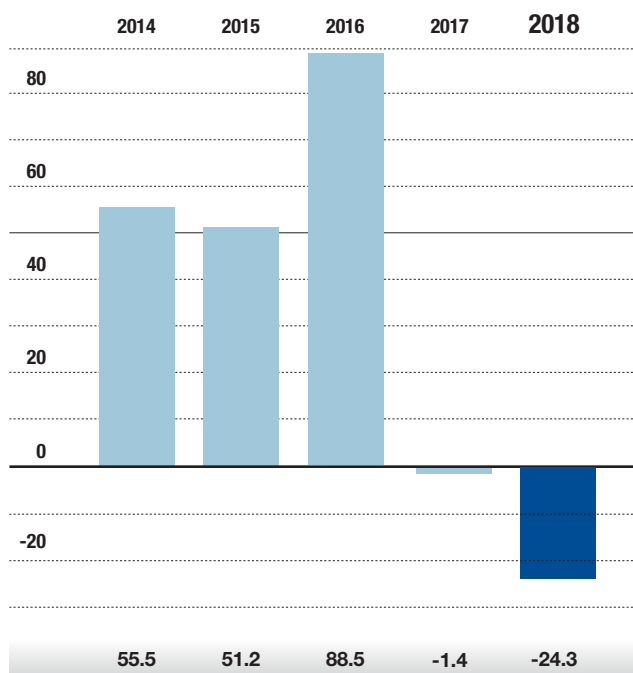
Revenues per segment

Digital Television

48.8 %

Public Access

40.6 %

Cybersecurity

10.4 %

Internet of Things

0.2 %

OIBDA *

2018

35.8 **

2017

60.3 **

Earnings per bearer share

2018

-0.5218 ***

2017

-0.2716 ***

*Operating Income Before Depreciation, Amortization and Impairment **

*In million USD ***

*In USD ****

Following an adoption of a new accounting standard, figures include latest restated comparative information published in annual reports.
2014-2016 figures have been restated in USD for comparison purposes.

THE KUDELSKI GROUP

A world leader in the creation and delivery of state-of-the-art technology solutions

A TRENDSETTER FOR DECADES

More than
500 million users enjoy
Kudelski Group solutions
every day

END-USER FOCUS

Thanks to highly advanced technologies that enable intuitive interactions, the Kudelski Group's solutions simplify the life of more than 500 million consumers in the world every day.

TECHNOLOGY PIONEER

The Kudelski Group has been a pacesetter for decades. Every day, passionate and talented people develop innovative solutions that fuel the Group's intellectual property patent portfolio.

ENGINEERING EXCELLENCE

The Kudelski Group is an undisputed expert in securing data, content and assets around the globe. Kudelski's solutions enable customers to grow in their markets with the necessary confidence.

A GLOBAL TECHNOLOGY LEADER

The Kudelski Group is the world leader in the creation
and delivery of state-of-the-art technologies to secure
the revenues of content owners and service providers for digital
television and interactive applications across all network types.
The Group's solutions enable consumers to access content
seamlessly over any device through a compelling
viewing experience.

The Group capitalizes on its patent portfolio through
cross access to state-of-the-art technology patents
and license agreements.

The Group is also a global leader
in Public Access solutions. The world's leading parking
facilities, stadiums and mountain resorts use its
SKIDATA people and vehicle management solutions.

Leveraging its long-standing expertise in securing
digital content and fighting piracy, the Group is a provider
of cybersecurity solutions and services focused on protecting
companies' and organizations' data, processes and systems.

The company also designs and delivers technology
and services to support companies across all industries
in securing their Internet of Things innovations.

THE GROUP'S HISTORY
AND HERITAGE ARE BUILT ON THE FLAGSHIP BRAND
"NAGRA", ORIGINALLY REFERRING
TO THE WORLD-FAMOUS RECORDER
DEVELOPED IN 1951.

THE COMPANY HAS EVER SINCE BEEN
A TECHNOLOGY PIONEER
DRIVEN BY A SHARP SENSE OF INNOVATION.

10 KEY DATES
IN THE GROUP'S HISTORY

› THE KUDELSKI GROUP

1951

Stefan Kudelski founded the company.
Launch of the first professional portable recorder, NAGRA I,
the start of a series of world-famous recorders
that revolutionized sound recording.

1989

First encryption systems for television developed
by André Kudelski's team and entry into the pay-TV sector.

1991

André Kudelski becomes
Chairman and Chief Executive Officer.

1995

First digital TV access solutions.

2001

Diversification into the Public Access sector
with the acquisition of SKIDATA.

2009

Acquisition of 100% of OpenTV: the Group's solutions manage the entire pay-TV ecosystem.

2012

Diversification into the cybersecurity sector with the creation of Kudelski Security.

2016

Opening of a second headquarters in Phoenix, Arizona. Launch of Insight, the Group's artificial intelligence and big data platform.

2017

Launch of the Group's Internet of Things (IoT) Security Center of Excellence to address demand for increased protection of connected devices.

2018

Further consolidation of the Group's Digital TV business with the merging of all product lines under the NAGRA brand. Further extension of the cybersecurity offering and increased footprint. Promising take-off of the Group's IoT offering.

COMPANY PORTFOLIO

Digital Television
NAGRA

Integrated content protection and multi-device user experience solutions, including watermarking and media asset management technologies.

Development, protection and licensing of the Group's intellectual property.

Public Access
SKIDATA

Integrated access and management solutions for car parks, ski resorts as well as sports, cultural, entertainment and exhibition facilities.

Cybersecurity
KUDELSKI SECURITY

Cybersecurity solutions and services for enterprises, governement and public sector organizations.

Internet of Things (IoT)
IOT SECURITY CENTER OF EXCELLENCE

Internet of Things technology and services to help companies across all industries to protect their devices, their data and their business models.

67
years of innovation

500 million
users

10 000
customers

3 742
employees

Presence in
32 countries

FOUR RESILIENT BUSINESS PILLARS WITH STRONG SYNERGIES

	NAGRA KUDELSKI Digital Television	**SKIDATA** KUDELSKI GROUP Public Access
DESCRIPTION	Long-standing expertise in content value chain protection and distribution technologies. Strong product range and customer footprint.	World leader in public access and revenue management solutions for ski resorts, off-street parking and events.
MAIN FOCUS	Secure, open, integrated platforms for broadcast, broadband and mobile networks with personalized viewing experiences. Key technologies for monetizing premium video content.	Integrated solutions to provide seamless, user-friendly access for people and vehicles to sites and installations such as car parks, ski-lifts, stadiums, arenas and amusement parks. SKIDATA solutions allow infrastructure operators to maximize their revenues.
GEOGRAPHY	Worldwide	Worldwide
DATE OF START	1951 (audio) 1995 (digital)	1977 (since 2001 in the Group)
MATURITY	High, with further development expected	High, with further development expected

Cybersecurity

KUDELSKI SECURITY

Unique positioning in securing large corporations' IT networks and infrastructures, from boardroom to field.

End-to-end cybersecurity solutions to a wide variety of customers across multiple sectors.

Protect enterprises & government against cyberattacks.

USA/Europe

2012

In development

Internet of Things

NAGRA KUDELSKI GROUP

Strong skillset and solutions to secure connected device and device-related data collection and exploitation, and decision-making process.

Resilient and easy-to-integrate and operate IoT security solution.

Keep the hackers away from IoT operations & protect strategic assets.

USA/Europe

2017

In development

STRATEGIC FOCUS

1

GROUP STRATEGY

Carving out leadership positions in growing markets

— Leverage our trusted partner role
— Improve synergies within the Group and simplify structure
— Address growth areas
— Leverage unique assets in adjacent domains

2

Solving key business issues through solutions innovations

— Grow our four businesses organically and through focused complementary investments
— Ensure future profitable business pipeline
— Increase our portfolio of high-value innovations
— Continue to pioneer the business relevance of new technologies

3

Long-term portfolio management

— Focus on long-term performance and sustainable value creation rather than just short term profit
— Reduce the cost of serving our customers
— Efficient use of capital
— Deleverage balance sheet
— Carefully select investment opportunities

SEGMENT STRATEGY

Digital Television

1. Selectively invest in our Digital TV security business

2. Better convert investments from the past into actual businesses

3. Explore profitable value segments in and adjacent to the video value chain

4. Further focus on user centric culture with innovation at its core

5. Continuously improve and manage operational excellence agendas

Public Access

1. Transform the SKIDATA distribution network to improve profitability & cashflow generation through synergies

2. Proactively increase service activity & further optimize client service

3. Embrace new technologies for new offerings – constantly develop breakthrough solutions to serve customers and increase revenue base

4. Champion digital transformation of industry – use data analytics and process optimization know-how to bring digitalization to customers

5. Upselling of value-adding solutions

Cybersecurity

1. Further expand position as trusted advisor designing cybersecurity strategies

2. Narrow focus to strategic and emerging technologies to deliver enhanced value

3. Continue to grow and expand managed security services, protecting client data wherever it resides

4. Expand focus on generating IP through Research, Development and Innovation

Internet of Things

1. Reach critical mass & mass deployments

2. Further expand customer base by partnering with Industry-specific device players, in industries in which security is business-critical

3. Complete development of comprehensive secure IoT platform

CROSS-FERTILIZATION PROVIDES A COMPETITIVE ADVANTAGE

› THE KUDELSKI GROUP

A SHARED PLATFORM SERVING ALL SEGMENTS

INNOVATION PROCESS AND INFRASTRUCTURE

— Gauge innovative technologies, market trends and opportunities
— Attract the best talents in respective fields
— Opportunistically develop value-added components, "one core, diverse industry applications"
— Create the right business model
— Scale globally and embed in division's activities

MARKETS & CUSTOMERS

— Digital-TV customers are natural prospects for Cybersecurity and IoT
— Sales force of DTV and KS are at the forefront of IoT development
— Shared Infrastructure and back offices
— Resources transfers in talent pool structure to ensure first class knowledge management

ADVANCED SECURITY EXPERTISE & TECHNOLOGIES

— Cutting-edge security technologies
— Embarked in devices on/off-line
— As seamless as possible to business operations
— Using vanguard technologies: AI, face recognition, watermarking, cloud, etc.
— Focused on business applications where critical to revenues

TOP 4 STRENGTHS

1 Megatrends

— Cybersecurity and IoT are two globally recognized megatrends

2 Differentiation

— Cutting-edge Swiss innovation leadership
— Swissness ensures independent technology at Kudelski

3 Platform for growth

— Strong brands in each business, recognized for outstanding client advice and execution
— Strong, satisfied customer base
— Exploit strong core skills in diverse industry applications

4 Governance

— A reference shareholder that takes care of the sustainability of the Group
— Successful track record in building disruptive business segments opportunistically from scratch

DIGITAL TELEVISION

Providing innovative solutions
for the entire premium content distribution
ecosystem

LEVERAGING 30 YEARS OF EXPERIENCE

Leveraging 30 years of experience in the digital television industry, the Kudelski Group develops and delivers a wide range of advanced secure content protection solutions addressing the needs of the digital television ecosystem across Internet, satellite, cable, terrestrial and hybrid end-to-end transmission systems.

NAGRA's digital television solutions enable the deployment and monetization of advanced services with the appropriate level of protection, providing consumers with a thrilling viewing experience.

Further improving efficiencies

Following the integration of Conax's solutions into NAGRA in 2017, the Group continued to streamline its Digital TV brand portfolio to further improve efficiencies, focus on core activities and deliver a broader end-to-end integrated solution offering. In 2018, it sold SmarDTV's Conditional Access Module and Set-Top Box businesses.
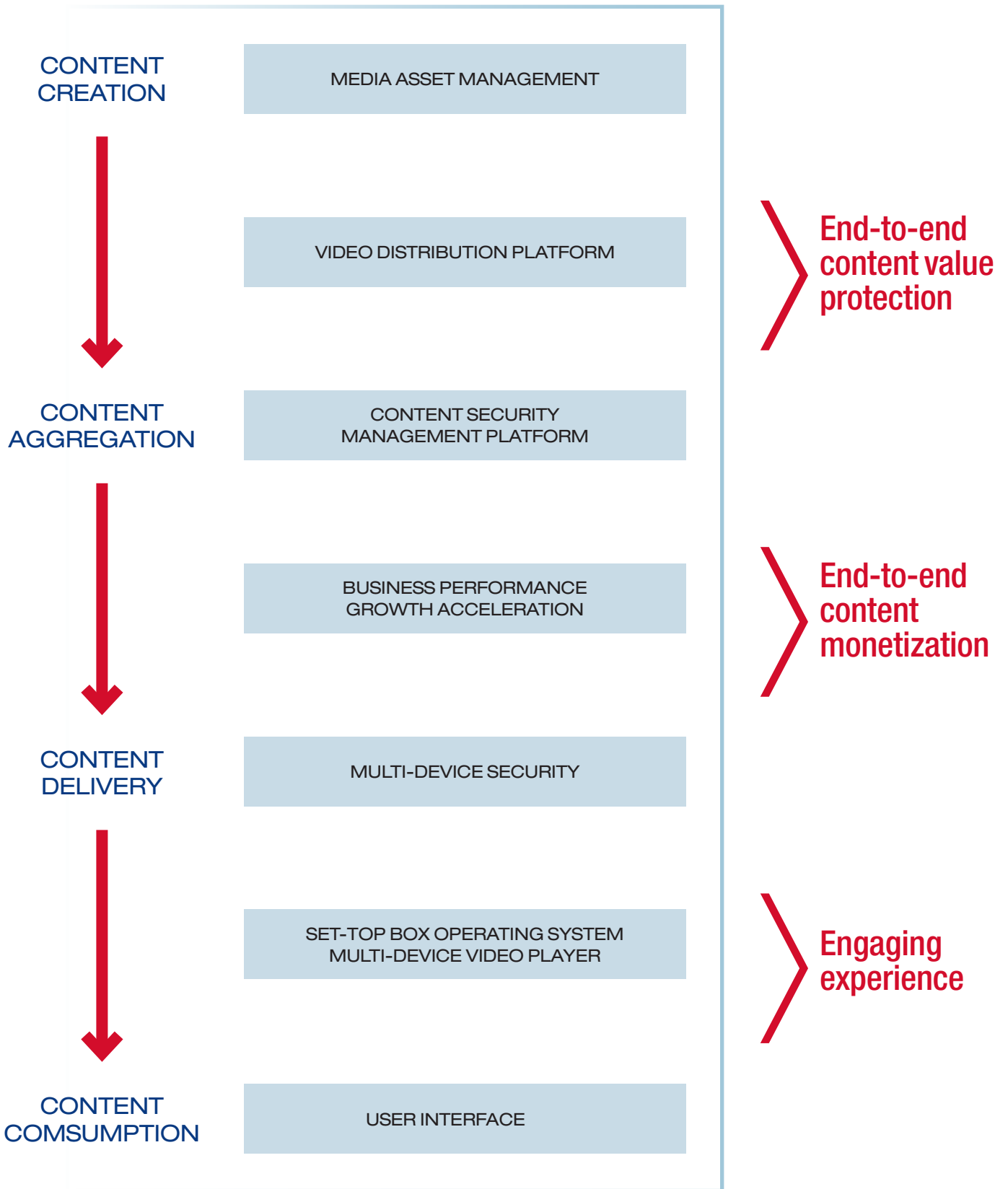
Unparalleled know-how and experience

NAGRA has unparalleled know-how and experience in the design of complete end-to-end secure digital pay-TV solutions. It is the leading provider of content protection solutions worldwide and the strategic content security partner to more than 550 of the world's largest and most innovative digital television service providers.

Innovative solutions addressing the entire content value chain

In a world where different business models arise and the lines between them are increasingly blurring, pay-TV service providers are uniquely positioned to become the central gateway to all the content that consumers love. Leveraging the latest cloud, Internet and data technologies, NAGRA solutions ensure content value protection, monetization and personalization, enabling new business models across the entire content value chain from origin to consumption.

Advanced and off-the-shelf offerings

NAGRA's extensive products portfolio provides the best of both worlds when it comes to advanced and off-the-shelf offerings. Service providers can choose from tailor-made solutions that leverage modular products and naturally blend into the environment of larger operators, or lean, off-the-shelf standard Conax solutions optimized for fast time-to-market.

CONTENT
CREATION

MEDIA ASSET MANAGEMENT

VIDEO DISTRIBUTION PLATFORM

**End-to-end
content value
protection**

CONTENT
AGGREGATION

CONTENT SECURITY
MANAGEMENT PLATFORM

BUSINESS PERFORMANCE
GROWTH ACCELERATION

**End-to-end
content
monetization**

CONTENT
DELIVERY

MULTI-DEVICE SECURITY

SET-TOP BOX OPERATING SYSTEM
MULTI-DEVICE VIDEO PLAYER

**Engaging
experience**

CONTENT
COMSUMPTION

USER INTERFACE

CONTENT VALUE PROTECTION

NAGRA's unique content value protection concept features security head-ends tailored to the business needs of pay-TV service providers.

Its solution offering includes a wide range of device security options including third party platforms, forensic watermarking and anti-piracy services.

A holistic approach to addressing the piracy threat

NAGRA leverages three main components to protect content owners against different forms of piracy throughout the entire content distribution ecosystem: CAS/multi-DRM platforms and solutions, forensic watermarking and anti-piracy services.

Advanced security to scale to any operation

As strategic security partner to leading pay-tv operators, NAGRA products are the natural choice for modular content value protection solutions that enable premium content delivery services across broadcast and OTT networks and to any screen.

Off-the-shelf security

NAGRA Conax off-the-shelf content security solutions address the needs of operators whose primary focus is cost-efficiency and fast time-to-market. The Conax unified content security platform delivers a highly efficient, feature-rich and cost-efficient CAS/DRM solution for any use case.

Growing piracy threat

Piracy against the media industry is a growing threat. Solutions to address this issue are limited. NAGRA's solutions combine deep intelligence about global pirate networks with real-time monitoring, take-down and litigation services, and forensic watermarking technologies that enable active defense against piracy – including online content sharing – and protect the operator's reputation and bottom line.

Protecting assets throughout their lifecycle

NexGuard provides studios, sports content providers, rights holders and distributors with an extensive portfolio of cutting-edge forensic watermarking applications to protect high value media assets throughout their entire lifecycle.

NAGRA SECURITY SERVICES PLATFORM (SSP) / CLOUD.SSP

A security platform that manages NAGRA CAS and DRM clients to enable secure premium content delivery to any device.

NAGRA CONNECT

A single converged CAS/DRM client that fully supports the multi-network, multi-device, multi-use case reality of telco and cable providers to reduce complexity and improve performance.

CONAX CONTEGO

An all-in-one, off-the-shelf head-end for one-way and two-way CAS use cases including multi-DRM support. It can be delivered on-premise, via a private or public cloud, or as a fully managed service.

DIRECT-TO-TV SOLUTIONS

NAGRA offers several ways to bring linear and on-demand pay-TV services directly and securely to TV sets without the need for a set-top box, enabling consumers to enjoy premium content up to 4K / HDR without connecting any cables and utilizing only the remote control of the TV set:

- NAGRA Connect for TV
- TVKey (NAGRA and Samsung)
- Conditional Access Modules

NEXGUARD

NAGRA supports the entire premium content lifecycle, with forensic watermarking solutions for pre-release, network ID, digital cinema, OTT streaming and pay-TV workflows.

ANTI-PIRACY SERVICES

These services apply all necessary procedural, technical and legal means to help both service providers and content owners secure, mark, monitor, detect, identify and act against piracy.

AN ENGAGING USER EXPERIENCE

Today, the media consumption industry requires
new technologies to facilitate direct access to digital
media content on multiple devices.

NAGRA has been at the forefront of entertainment technology
and continues to focus on digital content innovation;
ensuring the industry has the solutions to allow
consumers to always connect to the content they love.

From basic user to content connoisseur

NAGRA's product range offers a diverse set of user
experiences that can address simple and/or sophis-
ticated requirements. It provides consumers with the
best content discovery possible and satisfies a variety
of users, from basic to the content connoisseur and
enables operators to offer best-in-class services for
each customer profile.

Fully integrated multi-service pay-TV solution

NAGRA's OpenTV Suite is built to address the need for
unification and simplicity; allowing operators to focus
on operational efficiency, business profitability and
customer satisfaction. NAGRA's fully integrated OpenTV
modules are the building blocks to a complete opera-
tional pay-TV solution that delivers exceptional pay-TV
services to consumers, whether via broadcast, hybrid or
Internet networks, and with different standards such as
Ultra HD, HbbTV and ATSC 3.0 ready.

A consistent experience across all devices

OpenTV's lineup of user interface and user experience
products helps pay-TV service providers respond to the
challenges created by the rapid evolution of television
technology and television consumption habits. These
products are designed to deliver an engaging, enter-
taining and fully immersive, connected entertainment
experience to consumers, seamlessly blending the
broadcast and Internet worlds.

OPENTV EXPERIENCE

The unique ION user interface was created by NAGRA's award-winning design experts after extensive research with users of all ages and backgrounds. It provides a multi-journey and enhanced viewing experience that suits the viewer's individual needs.

OPENTV PLATFORM

A flexible, multiscreen management platform. Its modular components provide the tools to secure, manage and operate a wide range of media services, whatever the delivery network, device, or content type.

OPENTV PLAYER

Provides secure playout on a wide range of open devices. Advanced features, including personalized recommendations, multi-language audio tracks and subtitles, help subscribers get the most from their content.

OPENTV OS

An open architecture for development teams. It brings together the Linux OS, NAGRA's core digital TV components, and the latest Internet technologies, such as HTML5. Advanced PVR and home networking modules are provided as standard, as well as OTT broadband services.

CONAX GO LIVE

A turnkey, end-to-end OTT solution for streaming live TV to Android and iOS devices with a guaranteed deployment time of less than 30 days.

FORWARD-LOOKING OFFERINGS

Whether for in-home, on-the-go or cinema content distribution, from the sports fields and stadiums to the screens, NAGRA leverages its content protection, content management and Artificial Intelligence technologies to deliver new and smart viewing experiences to consumers.

Empowering operators to make better strategic decisions

Evolving viewer behaviors and a very dynamic competitive landscape are posing significant challenges to the premium content industry, leading to growing risks of increased churn and reduced ARPU (Average Revenue Per User) in several markets. With its Software-as-a-Services (SaaS) INSIGHT platform, NAGRA helps pay-TV providers drive their business using data. INSIGHT uses Artificial Intelligence (AI) to generate smart actions that improve the business performance and profitability. The platform leverages a cross-functional team that has strong pay-TV experience and that includes premium consultants, marketers, content distribution strategists, data scientists, architects, developers and data technologists.

Leveraging online streaming to deliver sports events

With scalable low-latency streaming technology, sports leagues and teams can now leverage online streaming to deliver sports events, highlights and stats to any viewer worldwide. NAGRA and its leading content, cloud and fiber network partners offer an integrated platform, from the field to the screen, that delivers extremely low-latency live OTT streaming while providing fans with an exciting application and channel-based user experience, from live events, to highlights, stats, fantasy sports and more.

Supporting VOD content expansion and complexity

As the volume of Video On Demand content increases and viewer expectations rise, service providers face cost, complexity and video quality challenges. NAGRA's DVnor Media Asset Management solution provides a simplified and automated workflow for VOD content, delivering optimal video quality, advanced audio and subtitling features, secure storage and distribution, as well as quick-start VOD services, leveraging NAGRA's leading security technologies.

Cloud-delivered cinema experience

The media industry has been revolutionized by the Internet and digitization. NAGRA has identified an opportunity to offer the cinema industry Internet-age solutions in order to support its modernization. The NAGRA myCinema content-as-a-service solution helps content owners and cinema operators connect audiences to new content formats and connects people to a new entertainment experience.

INSIGHT

Leveraging Internet agility and big data, this solution enables operators to boost business performance through actionable business intelligence and an iterative approach.

NAGRA SPORTS
OTT STREAMING

NAGRA's integrated solutions facilitate the production, management and monetization of direct-to-consumer sports services to any device, including iOS and Android.

DVNOR
MEDIA ASSET
MANAGEMENT

Automated all-in-one platform for metadata and digital file management, transcoding, storage, distribution and post-production services.

MYCINEMA

Enables simple, fast and agile programming of relevant content, securely streamed overbroadband networks to theatres, driving up occupancy, attendance revenue and customer loyalty.

2018 MARKET HIGHLIGHTS

Americas

In the USA, NAGRA continued to strengthen its long-term relationship with Altice USA, the fourth largest cable operator in the US with 4.9 million subscribers, who is expecting to launch a mobile service through a full MVNO (Mobile Virtual Network Operator) Agreement with Sprint in 2019. Altice USA has selected OpenTV Player, NAGRA SSP and NAGRA Connect to power and secure its new multiscreen experience by providing a secure playout on a wide range of open devices. In addition, Altice USA has selected NAGRA Insight, the advanced digital TV data platform that leverages artificial intelligence to address a number of business opportunities and challenges in order to increase both customer satisfaction and Altice USA's business growth.

In North America, NAGRA increased its multi-DRM adoption with its partner, Evolution Digital, which rolled out their platform to additional cable operators in the US.

NAGRA's renewed and expanded long-term content protection partnership with Liberty Global will benefit Liberty Global's Latin America's affiliates in Chile, Caribbean and Costa Rica, alongside its European operations.

In Brazil, NET Brazil launched a 4K set-top box with NAGRA OpenTV allowing its subscriber base to watch the World Cup in full UHD quality.

Telefónica, a global leader in telecommunications, has deployed the NAGRA Security Services Platform (SSP) managing the NAGRA Connect client to secure its Movistar IPTV service and 4K Ultra HD content in multiple countries with advanced set-top boxes. The announcement marks the first deployment of NAGRA SSP and NAGRA Connect with a telco provider in a native IPTV environment.

Deployment is on-going in Brazil, Spain and Argentina, with other countries to come in Q1 2019.

Through its Connect and SSP solution, NAGRA powers Telefónica's deployment of Netflix in the new-generation set-top boxes deployed in Perù, Telefónica being the first telco to offer this service in Perù.

In Mexico, Ultravision's new multiscreen service UltraTV, which is expected to launch in January 2019, will allow its subscribers to watch the best linear pay-TV channels in Puebla, Mexico, using their iOS and Android mobile devices. NAGRA enables the new service with pre-integrated, best-of-breed partner technology to create an end-to-end IPTV multiscreen solution that was ready to deploy in less than 30 days.

Asia – Pacific

Digital penetration of the Taiwan cable digitalization market has reached 100% in 2018 and operators shifted their momentum to OTT growth. NAGRA successfully partnered with both kbro & Taiwan Broadband Communications cable multi-system operators to launch their OTT services and move to a next-generation 4K platform.

In South Korea, with NAGRA's Conditional Access system, Korean satellite broadcaster KT Skylife reached more than 1 million 4K Ultra HD subscribers. Since 2017, NAGRA's NexGuard forensic watermarking is continuously applied to KT Skylife's new set-top box models to secure 4K premium video-on-demand contents.

In China, GDC launched NAGRA-enabled gateway set-top boxes and successfully deployed more than 500'000 units in 2018.

In India, operator consolidation in the satellite and cable space continues to offer new opportunities to NAGRA and add new cable subscribers. NAGRA launched a cloud-based multi-DRM solution with a large telco in India and also commenced the soft launch of the IPTV solution with a leading cable multi-system operator.

In Australia, NAGRA's OpenTV platform continues to provide back-end services to Foxtel's iQ3 HD set-top boxes and iQ4 Ultra HD set-top boxes.

In Vietnam, where digitalization plans were slowed down as the conversion deadline was postponed, NAGRA has won a multi-DRM cloud-based solution at VNPT.

In Indonesia, PT Linknet has selected NAGRA Protect for the hybrid cable deployment of their new Android-based 4Kset-top box.

CANAL+ adopted NAGRA GO Live in Myanmar to deploy Live OTT channels over mobile phones and tablets.

Africa

Digital migration in Africa is behind schedule in most countries but this did not prevent NAGRA's clients from continuing their growth.

In South Africa, the OpenView platform saw a 100% growth year-on-year and is now well on target to reach one million NAGRA encrypted devices deployed in 3 years.

Azam TV in Eastern Africa has also reached high numbers of devices deployed and is continuing to grow significantly.

In Nigeria, Inview has launched its push VoD service using the NAGRA PRM solution and will accelerate the DTT migration next year.

Startimes continued their DTT/DTH market growth in Africa with over 20 million subscribers powered by NAGRA Conax content protection technology.

The Conax Contego conditional access solution has been chosen by two additional clients. Msat, through its local subsidiary, has a DTH offering in Botswana using the cloud-based Conditional Access System, while another client opted for the on-premise solution for its DTT platform in Ghana. Msat will also be deploying a Push VoD service in 2019 using Conax Contego to secure its content.

Europe

CANAL+ and NAGRA jointly deployed anti-piracy services targeting major illegal streaming providers that impact Canal+. STUDIO Canal adopted NexGuard Pre Release in order to securely track movie distribution.

In France, NAGRA has expanded its digital security and convergent media solution partnership with SFR, a subsidiary of the Altice Group and one of France's largest telecom operators. NAGRA is now providing SFR with anti-piracy services to fight illegal live streaming of the UEFA Champions league and English Premiere League. This new agreement will leverage NAGRA's expertise in worldwide global intelligence, IPTV monitoring, takedown and litigation services against illegal content distribution including streaming. This evolution further confirms NAGRA's position as a key partner in the protection of live premium sports events.

As part of the global agreement in place with the Altice Group, NAGRA SSP, OpenTV suite and OpenTV Player have been successfully commercially rolled-out at HOT Telecom in Israel in order to power and secure all the operator's streaming and on-demand services on set-top boxes as well as on a wide range of open devices (including phone, tablets, smart TV, etc.).

NAGRA has renewed and expanded its content protection partnership with Liberty Global, the world's largest international TV and broadband company. As part of this new long-term agreement benefiting Liberty Global's affiliates in Europe (United Kingdom, Germany, Netherlands, Belgium, Switzerland and Eastern Europe) and also Liberty Latin America (Chile, Caribbean, Costa Rica), NAGRA will continue to provide its security solutions as used in Liberty Global's recently launched next generation TV entertainment platform 'Horizon 4' providing 4K Ultra HD services.

As the Italian media landscape is evolving quickly, NAGRA has expanded its footprint by securing Sky Italia's new retail DVB-T pay-TV service.

In Portugal, NAGRA is stepping up the fight against broadcast and streaming piracy of Benfica soccer league matches. NAGRA's Anti-Piracy Services will help combat pirate broadcasting and streaming of soccer games, in Portugal and abroad, for the 2018/2019 season. Also in Portugal, NAGRA is working on a project with NOS to secure, with the NAGRA Connect technology and SSP platform in the cloud, the recently introduced NOS IP set-top box technology.

Vodafone, one of the world's leading telecommunications companies, has selected and deployed the NAGRA Security Services Platform (SSP) to secure its multi-network TV service, Vodafone TV (VTV), across several countries including Italy, Greece, Spain and New Zealand, with other countries adopting it during 2019. Vodafone Group is the first operator to leverage the full operational flexibility and agility of the new NAGRA cloud SSP.

Telekom Srbija is launching a new DTH platform secured by NAGRA's Conax Contego solution targeting viewers in Serbia, Bosnia and Herzegovina and Montenegro. The new DTH platform will enable Telekom Srbija to broadcast more than 150 channels, including up to 30 in HD.

Romania's leading cable and DTH operator RCS & RDS deploys the NAGRA cardless solution, based on a new-generation NAGRA back-end – accommodating the seamless co-existence of smartcard and cardless security clients – to secure its services with a new cardless CAM. This new launch marks the first NAGRA cardless CAM module deployment for NAGRA.

In Poland, multiple cable operators have been migrated their existing security platforms to the unified Conax Contego latest generation content protection and Contego Multi-DRM solution, enabling flexibility to provide advanced OTT consumer offerings in the future.

In Serbia, Bosnia and Slovenia, NAGRA's Conax Contego content protection solutions secure United Group's EON, the first 4K Android TV hybrid deployment in the Balkans.

Middle East

MyHD, pay-TV operator in the Middle East, selected Contego CAS two years ago and will now start its OTT activity with the Conax Go Live solution in 2019. MyHD has been using NAGRA Anti-Piracy Services to fight against the illegal redistribution of their channels.

MANAGING THE PATENT PORTFOLIO

With over 65 years of innovation in developing award-winning products and investing close to $200 million annually in research and development, the Kudelski Group and its subsidiaries have carefully developed and strengthened their global intellectual property position over decades.

The Group has benefited broadly from its long-standing commitment to protecting its intellectual property rights and believes they are essential to ensuring collaborative development, future competitiveness and economic growth that would not be possible otherwise.

Thousands of patent assets

The Kudelski Group and its subsidiaries hold a substantial worldwide portfolio comprised of thousands of patent assets in a variety of technology areas, including digital and cybersecurity, access control, watermarking, digital television and rights management, among other areas. Many of these patents relate to fundamental and valuable technologies with broad impact across many businesses.

The Group's IP strategy, like the strategies of its core businesses, continues to adapt to changing market conditions and emergence of new opportunities. As such, the Group continues to review and optimize its approach to intellectual property protection, including its patent portfolio holdings to emphasize strategic value and return on investment.

Developing valuable intellectual property

The Group's Intellectual Property organization is responsible for setting the Group's overall intellectual property strategy with a focus on protecting, developing, managing and licensing the Group's worldwide patent portfolio and supporting the overall innovation programs within the Group.

In 2018, the Group continued its successful execution on its strategic intellectual property and innovation plan by entering into patent licenses with a number of leading sports streaming video platforms including the National Football League (NFL), NASCAR and Endeavor (the parent of NeuLion and the Ultimate Fighting Championship) and others.

There is no "one-size-fits-all" approach to product partnerships and intellectual property licensing. Different businesses have different needs and different technology requirements. To that end, the Kudelski Group seeks business relationships that extend beyond patent licensing. When appropriate, the Group's IP-based agreements incorporate product relationships, patent or technology transfers and cross-licenses into the engagement.

**Building reciprocal IP product partnerships
with key players**

The strength of the Group's patent portfolio, and
its intellectual property strategies and licensing
capabilities were evidenced further by the licensing
agreements concluded in 2018 with the NFL, NASCAR
and Endeavor. This is in addition to many of the
agreements concluded in prior years such as Apple,
Cisco, Google, Netflix, Disney, AT&T, Bloomberg,
Arris, Roku, Twitter, Hulu, Yahoo and Verizon.

Supporting the Group's cybersecurity business

2018 also continued to bring an increased focus in
supporting the Group's growing cybersecurity business,
Kudelski Security. The Intellectual Property organization
is enhancing the Group's patent portfolio in this area with
new patent filings and curating patentable technology
based on Kudelski Security's integration of the Group's
best-in-class security architectures developed for Pay-
TV with Research & Development in the cybersecurity
marketplace. Likewise, 2018 saw an increased focus on
research and development in the Internet of Things (IoT).
The Intellectual Property organization also oversaw new
patent filings in this area as the Group continued to bring
its security architecture expertise to bear on the IoT
marketplace.

In 2018, the Group ramped-up its efforts to engage
with a number of other technology leaders to expand IP
partnerships in terms of IP licensing and cross-licensing
as well as technology collaboration. The Group will keep
executing its plans to invest in innovation and protect
and license its intellectual property portfolio as well
as its plans to expand into more strategic industry IP
partnerships.

PUBLIC ACCESS

Comprehensive solutions to optimize revenues
for infrastructure operators

COMPREHENSIVE SOLUTIONS

SKIDATA carries out the Group's Public Access activities.

The company designs and markets comprehensive solutions which help infrastructure operators optimize their revenues and drive their business forward, and enable them to manage access to ski resorts, stadiums, fairs, amusement parks and parking facilities.

With a global footprint, SKIDATA manages large-scale, complex projects that involve technological challenges as well as innovative marketing and business models.

SKIDATA stands for 40 years of innovation. Since its foundation in 1977, SKIDATA has set standards in access and revenue management with global expert know-how and innovative solutions.

The division's broad spectrum of proven standard to customized solutions guarantees every customer the optimal solution to maximize sales and to offer the best comfort.

10 000
INSTALLATIONS
WORLDWIDE
IN OVER 100 COUNTRIES

750
NEW INSTALLATIONS IN 2018
WITH A FOCUS
ON LARGE PROJECTS

OVER 40 YEARS
OF SUCCESS
AND INNOVATION

GLOBAL LEADER IN ACCESS SOLUTIONS

SKIDATA is the global leader in access and revenue management solutions, providing fast and safe access for people and vehicles. With innovative concepts, SKIDATA has developed to an internationally successful digital solution provider and the world market leader in access and visitor management with over 10 000 installations in over 100 countries.

SKIDATA continues to increase its global footprint and steadily expands its cloud-based solution offering to provide the full advantage of digitalization to its customers.

Technological pioneer and innovation driver

SKIDATA is a pioneer and the world leader in the field of access and ticketing solutions for alpine regions. In 1977, SKIDATA introduced a cash register as well as printed ski tickets to the market – a milestone in the history of the mountain sports regions. Today's standard guest experience for skiers has been fundamentally shaped by SKIDATA and its subsequent patents and inventions. Over the last four decades, the portfolio was expanded with additional business units and innovative solutions like RFID chips for contactless entrance, vehicle access management, and solutions for stadiums, leisure parks and trade fairs.

A digital solutions provider

SKIDATA continuously strives to offer solutions that provide significant added value to its customers' businesses. With its extensive network of innovative technologies, SKIDATA solutions enable a wide range of functionalities, from fast and convenient access to venues and parking sites towards offering full benefits of the ongoing digitalization in visitor management, data management, dynamic pricing and revenue optimization.

With the new, cloud-based sweb Platform (SKIDATA Web Platform), customers benefit from a growing number of advantages of online ticketing, IoT monitoring & control tools and customizable BI suites, without sacrificing independence. In this ever-changing technological landscape, SKIDATA offers completely integrated solutions as well as open interfaces for rapid integration of third-party systems to tailor the solution to each individual customer.

Investing in strategic growth areas

Capitalizing on its steady growth and technological expertise, SKIDATA is well on track to continue shaping the future of access management by delivering innovative, intelligent and customer-oriented solutions.

SKIDATA continues to invest in the strategic growth areas that have brought success since the beginning: further expanding its global presence, delivering complete solutions with a focus on quality, usability and innovations – and continuously developing the expert know-how of its employees.

PLATE.GATE 'CUBE'

For further simplifying the use of SKIDATA's parking systems,
an advanced plate recognition solution has been invented, in the spirit
of the hands-free solution invented for ski access more than 30 years ago.

The new solution uses an infrared camera that enables
the reliable identification of license plates, day and night.
State-of-the-art image processing algorithms and AI-based OCR software
ensure that the vehicle is reliably identified via the license plate
and enables customer a quick access to car parks.

SWEB.VALIDATE

With this web-based service, car park operators can manage
the sale and administration of parking validations digitally and efficiently,
for optimized garage utilization. Validation credits collected
by the user with business partners (hotels, shops, etc.)
are automatically reduced from the applicable parking fees.

SKIOSK

This new range of smart kiosks creates a new experience
onsite for customers when buying tickets or annual passes
for amusement parks, leisure facilities and ski resorts.

The one-touch use concept and high-resolution touch screen,
plus the choice of the preferred payment option, make ticket purchase
a smooth experience for end-users.

For operators, central monitoring
and control with high ticket capacities ensure low operational
intervention and improved service level, around the clock.

proPOS.CASH

This new generation of cash desks is a powerful sales management solution
with flexible payment functionality. It combines ticket sales,
partner program and invoices in a single, intuitive platform.
The cloud-based, intuitive and touch-optimized system
can also run on mobile tablets.

2018 MARKET HIGHLIGHTS

LOS ANGELES FOOTBALL CLUB
CALIFORNIA – USA
New stadium with 22 000 seats

JBG SMITH CITY PARKING
WASHINGTON D.C – USA
Several car parks managed centrally

BJC-BARNES JEWISH HOSPITAL
SAINT-LOUIS – USA
Largest hospital in the US state of Missouri with 1 200 parking spaces

KUWAIT INTERNATIONAL AIRPORT
KUWAIT
13 735 580 passengers, 2 500 parking spaces

MODLIN AIRPORT
WARSAW – POLAND
1 300 parking spaces

ADNEC CAR PARK
ABU DHABI - UNITED ARAB EMIRATES
National exhibition center of the UAE with 6 000 parking spaces

ORLANDO CITY SOCCER CLUB
FLORIDA – USA

Stadium with 25 500 seats

FRANCE GALOP
FRANCE

First access control for horse racecourses

HIRUZEN BEAR VALLEY
OKAYAMA – JAPAN

First installation in Okayama prefecture, 2 400 passengers per hour

OBERALLGÄU TOURISMUS CARD
ALLGÄU – GERMANY

9 393 036 cards used per year

PARQUE ARAUCO SHOPPING MALL
SANTIAGO – CHILE

New shopping mall with 500 parking spaces

ZAYED SPORTS CITY
ABU DHABI – UNITED ARAB EMIRATES

National stadium of the UAE with 41 000 seats

CYBERSECURITY

Portfolio of integrated cybersecurity solutions
for enterprises, government and public sectors

BRINGING NEW FOCUS TO GLOBAL CYBERSECURITY SOLUTIONS

As a result of large and public breaches impacting millions of people, once-fringe subjects of ransomware, malware, denial of service attacks and phishing scams have captured the public's interest and earned the attention of senior leaders in public and private institutions around the globe.

The increasing sophistication of hackers have taken the risks of data and reputational loss to new heights.

A unique positioning

The Kudelski Group's positioning in cybersecurity is unique: as in other businesses within the company, success comes from the Group's ability to be "mission critical" to its customers. Kudelski Security is a trusted partner to the Board and Executive Committees of its customers. It provides a comprehensive offer to large companies to support them in securing their IT networks, infrastructure, data and devices:

– Advisory – Kudelski Security helps build the security strategy and identifies gaps or opportunities

– Technology integration – Kudelski Security installs and integrates the best technologies available to the market

– Managed services – companies outsource the management of their security to Kudelski Security

– Innovation – Kudelski Security develops proprietary solutions to address the most complex security challenges

Historical perspective

Continuing the Group's heritage of innovation and pivoting to meet emerging market needs, Kudelski Security was launched in 2012 as a program that extended digital security and encryption expertise to the cybersecurity sector.

By 2015, this business had grown to USD 5 million in revenue from non-digital TV clients primarily from consulting and managed security services delivered to Swiss clients. The Cyber Fusion Center designed and initially launched in Switzerland, for example, enabled clients to fuse threat intelligence with business and contextual data for a more holistic view of cybersecurity risks.

In 2015, an experienced management team was set up to grow this new business. The leadership team has since been focused on developing a comprehensive business strategy and establishing the capabilities to deliver the solution portfolio in selected geographic regions.

The acquisition of two solution providers in the US, Milestone Systems (in 2016) and M&S Technologies (in 2017), enabled Kudelski Security to get a significant US footprint and further evolve toward a more global focus. The entity became the largest pure-play cybersecurity solution provider in Switzerland and one of the fastest-growing cybersecurity solution companies in the United States, earning recognition from analysts, technology partners and customers.

Since expanding to the US in 2016, Kudelski Security continues to increase its strong foothold in the market, offering its growing Fortune 500 client base unique capabilities and a plan to change how clients work with providers to design, deploy and manage cybersecurity.

ADVISORY SERVICES

Adivsory Services empower organizations to build business-aligned security programs through a strategic cyber program approach across four strategic areas: Strategy and Governance, Risk Vulnerability and Threat Management, Incident Response and Cyber Resilience, and Cybersecurity Staffing.

TECHNOLOGY CONSULTING

Technology Consulting helps clients select and implement technologies that best suit their business and operational requirements through Technology, Architecture Design and Planning, and Solution Implementation services.

MANAGED SECURITY SERVICES

Delivered from Kudelski Security's proprietary Cyber Fusion Centers in Europe and the U.S., the Managed Security Services go beyond the traditional managed security solution providers by combining expert analysts, innovative technologies and detection and hunting approaches to more rapidly identify and block threats.

RESEARCH AND DEVELOPMENT SERVICES

With the R&D services delivered from its Research Centers, Laboratories and Security Centers of Excellence focused on IoT and Blockchain, Kudelski Security engages in cutting-edge research and development to address clients' toughest security challenges.

HIGHLY DIFFERENTIATING SOLUTIONS

Kudelski Security has been focused on leveraging the Group's historical strengths in R&D to fuel its differentiation strategy and challenge the traditional cybersecurity approach. A strong innovation philosophy has driven heavy R&D investment in product and service development across each of the four business pillars. The result is a comprehensive approach that provides clients unique but overlapping capabilities, acting as a force multiplier to significantly improve security business outcomes.

Continually challenging the status quo of cybersecurity

Kudelski Security has set its vision on continually challenging the cybersecurity status quo, uniting world-class and innovative consulting and managed services and technologies to deliver real business outcomes for its clients. The objective is to increase confidence, cyber-resilience, and protection of data across their digital ecosystems, globally.

To deliver on its vision, Kudelski Security's solution portfolio covers the main components of comprehensive cybersecurity, with a focus on service categories that are in high demand and allow scope for enrichment through proprietary innovation and advanced R&D.

Since launching its new business strategy in 2016, Kudelski Security has continued to gain market momentum through client adoption and positive recognition for its multidimensional approach to cybersecurity from partners and industry analysts.

Kudelski Security continues to expand with new organic growth, broader client relationships, new and innovative market offerings and additions to its experienced team of cyber professionals.

Innovation drives industry recognition

Across the company's four business pillars, an important percentage of revenue is invested in R&D focused on new offerings that help clients address expanding risks associated with the increasing sophistication of attackers, the dramatic shortage of skilled cybersecurity professionals and the increased complexity and diversity of enterprise networks.

Kudelski Security continues to earn industry acclaim for its innovation, vision and ability to deliver for clients:

Gartner
– Recognized Kudelski Security for two years in a row for unique and innovative Managed Detection and Response capabilities.

– Recognized Kudelski Security for innovation in managed security services.

Forrester
– Recognized Kudelski Security as a Leader in Emerging Managed Security Service Providers, Q3, 2018, largely for the unique scope of Kudelski Security's next-generation managed security offerings and the effectiveness of its innovative client service portal.

– The Forrester Wave report evaluated 10 top emerging managed services providers and identified Kudelski Security as one of the two leaders in the category.

Frost and Sullivan
– In January 2018, profiled Kudelski Security as an advanced player in threat detection, leveraging cutting-edge technology.

– Confirmed the need for cyber business management methods and tools such as Secure Blueprint to help measure and improve the effectiveness of cybersecurity operations.

MSSP ALERT
– Recognized Kudelski Security as a leading international
Managed Security Service Provider for two consecutive
years, improving in 2018 to a top 20 position and
eclipsing larger and more mature competitors. The
annual company list identifies and tracks the world's
leading MSSPs that specialize in outsourced
cybersecurity services.

CRN
– Rich Fennessy, Kudelski Security's CEO, named as
one of the industry's Top 25 Disruptors.

Looking ahead

In 2019, Kudelski Security plans to launch several
flagship innovations:

– **Cloud-security focused offerings**
Leveraging its expertise in designing, implementing
and operating secure DevOps organizations, Kudelski
Security has launched a breadth of cloud-security
focused offerings including cloud platform monitoring,
SaaS monitoring, cloud configuration monitoring and
cloud strategy assessments.

– **Managed Services**
in 2019, Kudelski Security's award-winning MSSP
will add the capability to monitor data in all three major
cloud providers and with the top SaaS providers.
It will also expand monitoring offerings for IoT, IIoT
(Industrial IoT) and operational technologies (OT).

– **Blockchain**
Blockchain has the potential to disrupt business
models across many different industries. In early 2019,
Kudelski Security launched a Blockchain Security
Center, focused on assisting companies in designing
and protecting their blockchain businesses. Kudelski
Security's long-term focus is on leveraging the Group's
expertise in end-to-end system design and
cryptography to build blockchain-based products.

– **CISO Strategy**
In early 2019, Kudelski Security launched Secure
Blueprint in Europe and will bring risk management
into the Secure Blueprint platform to supplement
strategy management.

2018 MARKET HIGHLIGHTS

Throughout 2018, Kudelski Security continued to launch innovative products and services and expand geographically to drive new business. This includes a strong adoption of managed security services which feature multi-year service agreements for Kudelski Security's Cyber Fusion Centers in Switzerland and the US.

Managed Security Services (MSS)

Next generation Cyber Fusion Center

The first-generation Cyber Fusion Center (CFC) was launched in Switzerland in 2013. In early 2016, the CFC infrastructure was redesigned to enable the delivery of more advanced managed security services as well as to support efficient global expansion.

The next generation of the CFC was launched concurrently in the US and Switzerland in April 2017. This new version was powered by innovation and the introduction of proprietary technologies to analyze business and security events. It integrates powerful best-of-breed commercial products for threat hunting and attacker deception and an intuitive, informative client portal experience to ensure that relevant details on alerts and threat intelligence are accessible to clients at all times.

These new differentiated capabilities were recognized by analysts for their innovative features and in 2018 earned broad distinction from global industry analysts. Since the relaunch, client adoption has continued to accelerate in both Europe and the United States and MSS represents Kudelski Security's fastest growing segment.

Extended offering to operational technology protection

In May 2018, Kudelski Security launched a managed security service focused on the protection of Operational Technology (OT) and Industrial Control Systems (ICS).

To facilitate the new offering, Kudelski Security entered into a strategic partnership with Claroty, whose technology will be integrated with Kudelski Security's Cyber Fusion Centers. Claroty is a leading technology for OT and ICS network protection.

Operational technology represents a growing risk for clients. While a few prominent breaches in critical infrastructures have highlighted the need for better security, many organizations still struggle to monitor their industrial environments effectively. Malicious activity on OT networks is on the rise, as evidenced by the increased in threat activity from ICS attack groups and the emergence of ICS-specific malware. Kudelski Security is addressing this gap with defined services and proven technology that help reduce risks for clients.

Kudelski Security's managed security service offering has continuously driven new innovation across Europe and the United States, and was the first to offer services such as managed attacker deception and managed detection & response (MDR).

R&D

Custom proprietary solutions

Kudelski Security's researchers, engineers and developers work directly with clients on specific projects to analyze new and challenging security problems, and then develop custom proprietary solutions to address them. Examples of specific client projects include a secure, isolated IT enclave and an advanced cloud monitoring technology, both of which are expected to be launched in 2019 as proprietary Kudelski solutions.

Enabling secure tracking solutions

In 2018, Kudelski Security announced a strategic agreement with Vypin, a provider of IoT solutions featuring sensor-based beacons and supporting management software. Through this partnership, Vypin licenses power-efficient, anti-spoofing technology designed by Kudelski Security to extend the life span of Vypin's beacons and IoT tags.

Developing new functional encryption technologies

Kudelski Security has been selected to participate in FENTEC, a 2-year project of the European Commission, Horizon 2020, to develop new functional encryption technologies. The initiative brings together 10 partners from across Europe and several leading universities.

New Blockchain Security Center

Blockchain has the potential to revolutionize business capabilities, creating new avenues of efficiency and supercharge technology applications across all industries and sectors.

In January 2019, Kudelski Security announced the launch of its Blockchain Security Center focused on extending Kudelski's encryption expertise through new products and services that secure blockchain-based solutions increasingly used by organizations across the world.

The Blockchain Security Center will develop a suite of expanded cryptographic solutions, full-stack enterprise blockchain security recommendations, and developer tools to support the entire blockchain ecosystem.

Technology

Reference architectures

In the Technology pillar, Kudelski Security innovates through the development of Reference Architectures that address strategic client concerns such as Endpoint Security, Cloud, and IoT. These documents outline risks and challenges, then serve as the basis for recommendations on how specific technologies can be employed to optimize security and meet business and operational objectives.

In addition, teams of solution architects and engineers provide technology assessments and infrastructure design services to help ensure clients have the robust IT environments required to enable improved security.

Technology partnerships

Kudelski Security works closely with leading technology manufacturers such as F5, Juniper, McAfee, Fortinet, CrowdStrike and Palo Alto Networks, and provide clients the expertise to integrate security technologies across their environments.

Kudelski Security's partnership ecosystem is monitored continually to ensure that the security solutions provided by Kudelski Security match evolving client needs.

Advisory

Industry's first Cyber Business Management platform

A critical gap for most security leaders is the ability to centrally manage the vast number of components affecting enterprise security, then translate these complex programs into meaningful language that can be reviewed along with other business strategies. To that end, Kudelski Security has introduced the industry's first Cyber Business Management Platform, Secure Blueprint. This unique and proprietary solution launched in the United States in the third quarter of 2018 and in Europe in early 2019.

The Secure Blueprint SaaS platform meets an important emerging need for cybersecurity leaders by providing a real-time tool that sits on the chief information security officer's desktop to track the maturity and effectiveness of their security program, align security initiatives with business priorities, and help communicate the state of cybersecurity programs to business leadership.

Secure Blueprint helps create a true, business-driven cybersecurity strategy that is framed in risk management terms. It includes executive dashboards and dynamic roadmaps that help leaders prioritize investment decisions to ensure that the program can be continuously refocused to evolving contexts.
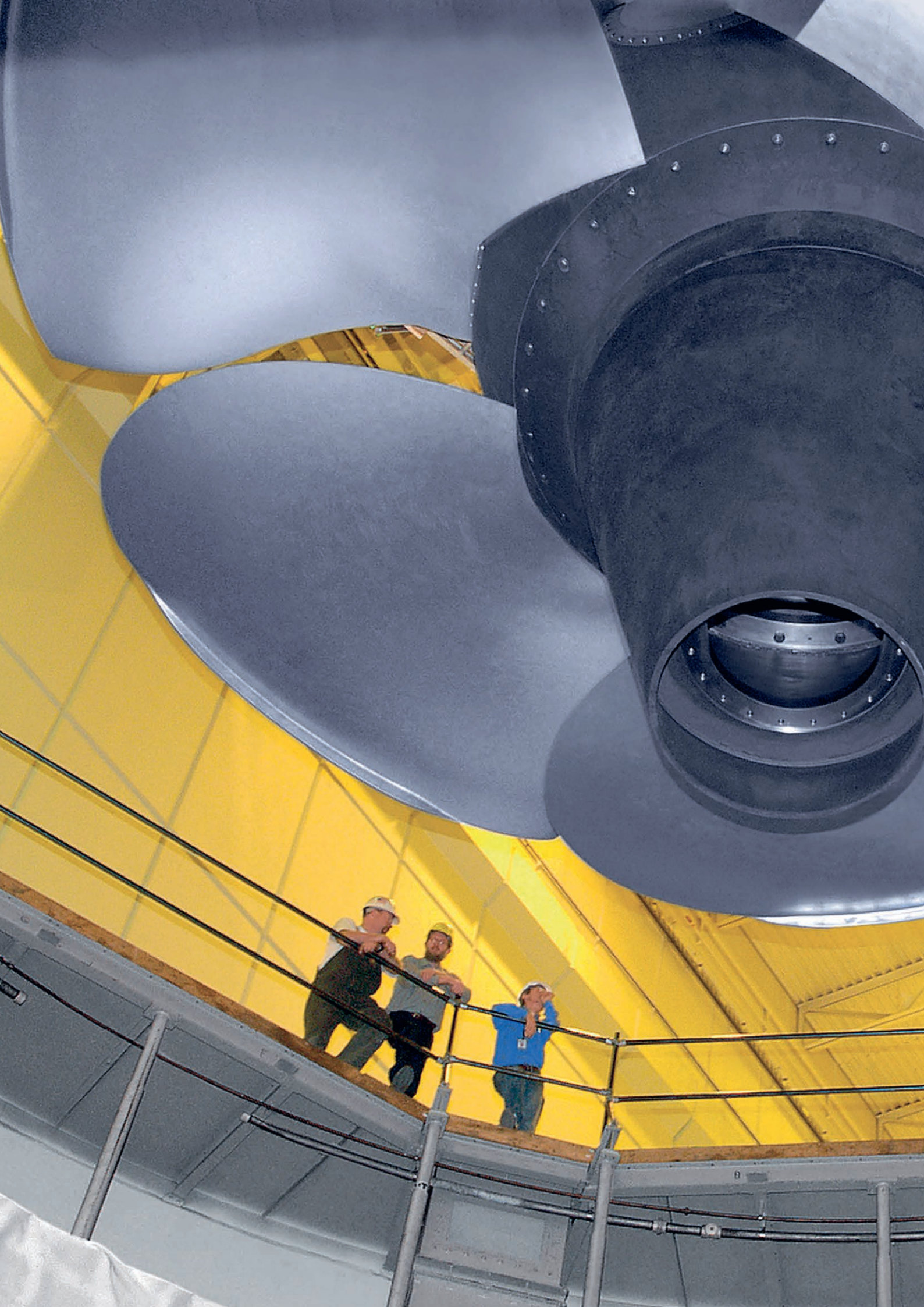
INTERNET OF THINGS

Pioneering solutions
to make IoT simple and secure

SECURITY CENTER OF EXCELLENCE

Throughout all industries, there is a massive trend to digitalization and device connectivity, enabling operational efficiency gains and new business models. Market analysts expect 25 billion connected devices by 2021.

Leveraging 30 years of innovation in the fields of digital content and device protection, the Kudelski Group has unparalleled ability to provide solutions to address demand for increased protection of connected devices.

30 years of real-life experience

Digitalization is by now widely considered to be the foundation of innovation and growth and therefore is becoming part of every company's core strategy.

With on-going digitization, companies are deploying connected devices and services and need to be able to trust their devices and the data they produce in order to drive new business models, operational efficiency and better decision.

However, the deployment of these devices is outpacing companies' ability to adequately protect them using important "security by design" principles. The result is millions of connected but unsecure devices, ripe for attack by criminals, competitors and hackers.

The Kudelski Group's 30 years of real-life experience in deploying and protecting connected embedded systems is what makes it unique in the IoT industry.

The Group's security technologies and services have been widely deployed in real-life systems. From the beginning, they have been exposed to severe piracy attacks and have proven to be extremely robust, mass-scalable and future-proof to accommodate the rapid business evolution of the Kudelski Group's customers.

By leveraging its unique heritage in both pay TV and cybersecurity, the Kudelski Group is uniquely positioned to provide companies with design, implementation and long-term security lifecycle management of their connected business models across a variety of industries.

End-to-end solution

Kudelski addresses security from a system, end-to-end perspective, protecting all aspects of the connected business' ecosystem, its devices, collected data, intellectual property and associated monetization models. The approach also incorporates Security Lifecycle Management that ensures that security is sustained throughout the lifetime of the device.

DESIGN, ASSESSMENT AND CERTIFICATION SERVICES

Kudelski's IoT experts help develop secure systems to guarantee the integrity of the signal and of the messages, in areas in which the impact of a security breach can be highly damaging of a company, the consumer or even critical infrastructures.

IOT SECURITY PLATFORM

The Kudelski Group's IoT Security Platform provides a rich basis to enable business features using its secure foundations in the device (hardware and/or software-based) and its simple device and application API's.

For instance, the solution protects data from the point of collection (e.g. sensor, camera or other device) to the application that utilizes the data, whether that data is at rest or in motion, and ensures that data is only accessible to authorized parties.

LIFECYCLE MANAGEMENT

Security Lifecycle Management is the active protection of the customer's connected business model over time, using security monitoring, the proactive update of security, and response to security incidents through the application of built-in countermeasures or new security features.

2018 MARKET HIGHLIGHTS

Expanded offering

Kudelski announced its first IoT initiative in 2017, the IoT Security Center of Excellence, providing IoT device and ecosystem security assessment, design and certification services to IoT device manufacturers.

The Center continues to draw new customers who wish to leverage Kudelski's extensive expertise in hardware and software security as well as security architecture and design.

2018 saw a significant expansion of Kudelski's IoT activities with the development of its IoT Security Platform, enabling device manufacturers, communication service providers and their end-customers to establish a trusted relationship between IoT devices and their associated applications.

The Kudelski Group's IoT Security Platform is tailored to deliver value in the specific industry ecosystems. Kudelski partners with specialists to bring a joint offer tuned to the market specificities of each different vertical.

Partnering with key industry players

The Kudelski Group has established a footprint in security solutions for wireless IoT, industrial IoT, smart cameras and consumer products and is exploring other verticals. The company signed a number of agreements with key industry partners and customers in 2018:

– **Cellular IoT**
In 2018, the Group signed an agreement with Swiss firm u-blox, a global leader in positioning and wireless communication technologies for the automotive, industrial and consumer markets. The companies agreed to integrate the Kudelski IoT Security Platform into multiple u-blox product lines, enabling premium device protection and security lifecycle management (including secure firmware over the air – FOTA – upgrades), as well as secure communications and application data protection.

In early 2019, the Group and IDEMIA, the global leader in augmented identity, announced a partnership that provides manufacturers and service providers a single, fully-integrated solution to manage the network connectivity and security of cellular IoT devices. The joint solution will allow IoT device manufacturers to simplify the integration process and speed time to market for new devices while providing future-proof connectivity and security.

– **Industrial IoT**
Kudelski announced its cooperation with Voith, a global technology group that sets standards in energy, oil & gas, paper, raw materials and transport & automotive markets.
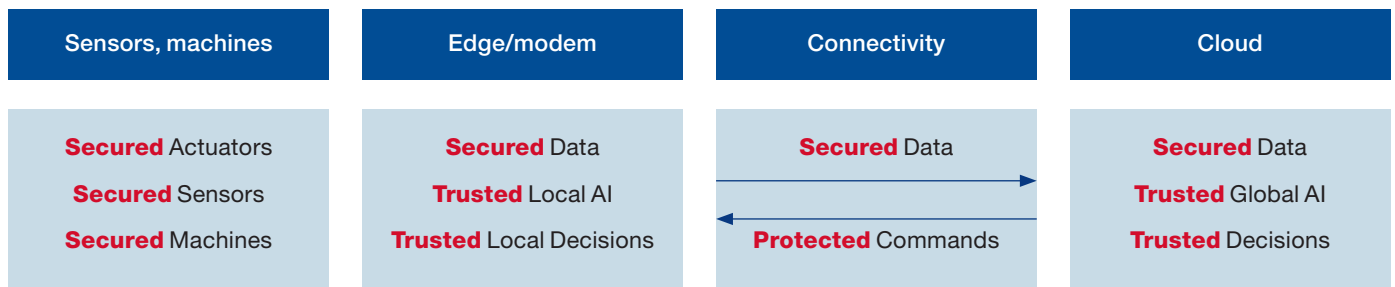
The goal of the partnership is to collaborate to develop focused solutions that support customers with their digital transformation journey and reliably protect their industrial environments from new and emerging cyber and physical security threats. The partnership will leverage the full portfolio of Kudelski IoT Security products and services.

– **Consumer Electronics IoT**
The company announced a long-term collaboration with American company Pepper to protect IoT service providers and retailers from cybersecurity risks and increase consumer confidence.

Both companies will work together to influence best practices and criteria for retailers and service providers to minimize the risk of cybersecurity threats. They will also provide the tools and capabilities for device manufacturers to meet those best practices and criteria using the Kudelski IoT Security Platform.

IOT ARCHITECTURE FROM DEVICE TO CLOUD

Sensors, machines	Edge/modem	Connectivity	Cloud
Secured Actuators **Secured** Sensors **Secured** Machines	**Secured** Data **Trusted** Local AI **Trusted** Local Decisions	**Secured** Data **Protected** Commands	**Secured** Data **Trusted** Global AI **Trusted** Decisions

MANAGED SERVICES
Secured IoT Platform
Data. Devices. Control. Connectivity

DISCLAIMER
This report contains forward-looking statements, including, but not limited to, statements that are predictions of or indicate future events, trends, plans or objectives. These statements are subject to known and unknown risks and uncertainties and could be affected by other factors that could cause actual results, plans and objectives to differ materially from those expressed or implied in the forward-looking statements. Potential risks and uncertainties include such factors as general economic conditions, performance of the financial markets, competitive factors and changes in laws and regulations.